~~34. (New) The apparatus of claim 29 wherein the buffer discards uncaptured frames.~~

REMARKS

Applicant respectfully requests reconsideration of the above-referenced U.S. Patent application as amended herein. Claims 1-16 have been cancelled. Claims 17-34 have been added. Thus, claims 17-34 are pending.

Objection to the Specification

The disclosure was objected to for an informality. Specifically, on page 13, line 2 "an image edge circuit 26" is mentioned and line 17 of the same page refers to an "edge detection circuit." The paragraph has been amended to be consistent. Therefore, Applicant requests that the objection to the specification be withdrawn.

Claim Rejection - 35 U.S.C. § 102(a)

Claim 1 was rejected as being anticipated by U.S. Patent No. 5,574,700 issued to Kuzma (*Kuzma*). Claim 1 has been cancelled; therefore, the rejection of claim 1 is moot. For at least the reason set forth below, Applicant submits that new claims 17-34 are not anticipated by *Kuzma*.

Claim 17 recites the following:

> converting a frame of analog image data to a frame of digital image data that includes pixel data;
> **capturing the frame of digital image data;**
> converting subsequent frames of analog image data to frames of digital image data that include pixel data;
> comparing the pixel data of the converted subsequent frames to the pixel data of the captured frame **to identify a converted subsequent frame whose pixel data differs from the pixel data of the captured frame by a threshold amount;**

capturing the identified frame;
sending the **captured frames** to a display object.

Thus, Applicant claims capturing a frame, capturing a subsequent frame whose pixel data differs from pixel data of the captured frame by a threshold, and sending the captured frames to a display object. Claim 23 similarly recites capturing a frame, capturing a subsequent frame whose pixel data differs from pixel data of the captured frame by a threshold, and sending the captured frames to a display object.

Kuzma discusses an encoding technique using a key (i.e., reference) frame to determine whether subsequent frames are still or moving picture frames, and what strategy to use to encode/decode the frames. See, e.g., col. 2, lines 25 to 29; col. 5, lines 11 to 20 and lines 49 to 65; col. 6, lines 30 to 33; col. 7, lines 16 to 34. Scene changes between frames are used to select a frame transmission rate. See col. 5, line 66 to col. 6, line 16. The frame transmission rate may be lowered by arbitrarily dropping frames, depending on available bandwidth. That is, available bandwidth will determine what frame rate is allowable, and frames are randomly dropped to achieve this frame rate, and a decoding strategy is determined to adjust the resolution to compensate for dropped frames. See col. 8, line 51 to col. 9, line 15.

In contrast, claims 17 and 23 recite capturing a frame, capturing a subsequent frame whose pixel data differs from pixel data of the captured frame by a threshold, and sending the captured frames to a display object. Thus, *Kuzma* does not anticipate the invention as set forth in claims 17 and 23 because it fails to disclose at least the limitations that frames are captured and sent to a display object when their pixel data differ by a threshold.

Claims 18-22 depend from claim 17. Claims 24-28 depend from claim 23. Because dependent claims necessarily include the limitations of the independent claims from which

they depend, Applicant submits that claims 18-22 and 24-28 are not anticipated by *Kuzma* for at least the reasons set forth above.

Claim 29 recites the following:

> a frame conversion unit to convert frames of analog image data to frames of digital image data that includes pixel data;
> a buffer coupled with the frame conversion unit to store a frame of digital image data and subsequent converted frames;
> a processor coupled with the buffer to compare pixel data of the frame of digital image data and the subsequent converted frames to **identify a subsequent converted frame whose pixel data differs from the pixel data of the frame of digital image data by a threshold amount**; and
> a transmission unit to **send the frame of digital image data and the identified frame** to a display object.

Thus, Applicant claims a buffer to store a frame of digital image data, a processor to identify a subsequent converted frame whose pixel data differs from pixel data of the frame of digital image data by a threshold, and a transmission unit to send the frame of digital image data and the identified frame to a display object.

As discussed above, *Kuzma* discusses determining an encoding technique for frames based on available bandwidth, and altering a frame transmission rate if bandwidth is not available. Thus, *Kuzma* does not anticipate the invention as set forth in claim 29 because it fails to teach or suggest at least the limitation of a transmission unit to send a frame and a subsequent frame whose pixel data differs from pixel data of the frame by a threshold to a display object.

Claims 30-34 depend from claim 29. Because dependent claims necessarily include all limitations of the independent claims from which they depend, Applicant submits that claims 30-34 are not anticipated by *Kuzma* for at least the reasons set forth above.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 2-16 were rejected as being unpatentable over *Kuzma* in view of U.S. Patent No. 5,519,790 issued to Manning (*Manning*). Claims 2-16 have been cancelled; therefore, the rejection of claims 2-16 is moot. For at least the reasons set forth below, Applicant submits that new claims 17-34 are not rendered obvious by *Kuzma* in view of *Manning*.

As discussed above, *Kuzma* fails to disclose the limitations that frames are captured and sent to a display object when their pixel data differ by a threshold, as recited in claims 17-28. *Manning* is cited to teach various comparison techniques for comparing a frame to a reference frame. Even assuming the characterization of the reference as set forth in the Office Action is correct, which Applicant does not concede, *Manning* fails to cure the deficiencies of *Kuzma* with respect to claims 17-28 because it does not disclose that frames are captured and sent to a display object when their pixel data differ by a threshold. Therefore, the invention cannot be rendered obvious by *Kuzma* in view of *Manning* because both references, either alone or in combination, fail to teach or suggest at least one limitation of the invention as set forth in claims 17-28.

As discussed above, *Kuzma* fails to disclose the limitation of a transmission unit to send a frame and a subsequent frame whose pixel data differs from pixel data of the frame by a threshold to a display object, as recited in claims 29-34. Even assuming the characterization of *Manning* as set forth in the Office Action is correct, which Applicant does not concede, *Manning* does not cure the deficiencies of *Kuzma* with respect to claims 29-34 because it fails to disclose a transmission unit to send a frame and a subsequent frame whose pixel data differs from pixel data of the frame by a threshold to a display object. Therefore, the invention cannot be rendered obvious by *Kuzma* in view of *Manning* because both

references, either alone or in combination, fail to teach at least one limitation of the invention as set forth in claims 29-34.

Conclusion

For at least the foregoing reasons, Applicants submit that the rejections have been overcome. Therefore, claims 17-34 are in condition for allowance and such action is earnestly solicited. The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.

Please charge any shortages and credit any overcharges to our Deposit Account number 02-2666.

Respectfully submitted,
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MARKED VERSION OF THE AMENDEMENTS

IN THE SPECIFICATION

In the paragraph on page 13, line 17 to page 14, line 7:

Based on the output of the image edge detection circuit 26 the microcontroller 16 further controls the delay device 18 and the counter 22 to eliminate phase noise and tracking errors. Based on the output of the reference frame capture circuit 27, the microcontroller 16 further controls the capture to frame memory in WRAM 132 of a reference frame from the frames output from the A/D converter 24 so as to eliminate phase noise and image distortion. The number of reference frames captured depends on the type of image being processed and a threshold setting such that the rate of capture of a reference frame is lower when the image is static (e.g. fixed image presentations) , and higher when the image is dynamic (e.g. full motion video). The threshold setting is pre-selected to provide for the maximum elimination of phase noise and distortion, while providing a sufficient number of reference frames for proper replication of the digitally converted image at the display object 28. It should be understood that the outputs of the image edge detection circuit 26 and reference frame capture circuit 27 are both independent and complementary such that the reference frame capture circuit 27 may be used alone or in combination with the image edge detection circuit 26 or other methods to improve the quality of the digitally converted image displayed by the display object 28.

In the paragraph on page 15, line 20 to page 16, line 11:

Referring now to **FIG. 8**, wherein a block diagram overview of the functional components of the reference frame capture circuit 27 in accordance with one embodiment of the present invention is illustrated. As shown, the reference frame capture circuit 27 has a microcontroller interface connected to the microcontroller bus 42, and receives inputs from the line advance signal conductor 53, pixel clock signal conductor 54, and the V_{sync} frame advance signal conductor 58. The reference frame capture circuit 27 also receives pixel data input 101 from the color data signal channels 56a, 56b, 56c, through the output 101 of the pixel value calculator 97. Access to a current reference frame in stored frame memory is provided through an input port of the WRAM 132. A horizontal position counter (HPC) component 105 uses input from the line advance conductor 53 and the pixel clock conductor 54 to determine the current pixel [pi*/xel] position of the pixel data input 101. The reference frame capture circuit 27 receives a threshold value input 110 used by a pixel value comparator component 115 to compare the pixel values of the pixel data input 101 to the corresponding pixel values of the lines of the current reference frame. The reference frame capture circuit 27 further

includes a reference frame capture switch 120 to trigger the microcontroller 16 to capture a new reference frame to store in WRAM 132 stored frame memory for eventual transmission to display object 28.